

IN THE CLAIMS

Please amend the claims as follows:

1. (Currently Amended) An ultrasonic flowmeter for measuring a flow rate of a fluid to be measured, comprising:

an ultrasonic transducer including,

an ultrasonic transmitter for launching ultrasonic pulses of a prescribed frequency into the fluid to be measured in a fluid pipe from the ultrasonic transducer along a measurement line, and

a receiver for receiving ultrasonic echoes reflected from a measurement region among the ultrasonic pulses incident into the fluid to be measured;

a flow velocity distribution measurement means for measuring flow velocity distribution of the fluid to be measured in the measurement region based on the received ultrasonic echoes;

a flow rate operation means for calculating a flow rate of the fluid to be measured in the measurement region based on the flow velocity distribution of the fluid to be measured; and

a wedge for fixing said ultrasonic transducer to the outer surface of the fluid pipe for the fluid to be measured,

wherein the transducer is fixed on the wedge such that at the prescribed frequency a distance of wave propagation from said ultrasonic transducer to an outer surface of the fluid pipe is an integral multiple of a half-wave length of an ultrasonic wave incident into the fluid to be measured, and the prescribed frequency is determined by:

determining a distance of wave propagation from the outer surface of the fluid pipe to an inner surface of the fluid pipe, and

setting the prescribed frequency as a frequency of an ultrasonic wave for which the distance of wave propagation from the outer surface of the fluid pipe to the inner surface of the fluid pipe is an integral multiple of a half-wave length of an ultrasonic wave incident into the fluid to be measured; and

wherein a distance from the ultrasonic transducer in a direct line to the outer surface of the fluid pipe contacting the wedge is made longer than a distance obtained from multiplying a velocity of the ultrasonic wave penetrating through the wedge by a time of dead zone that an ultrasonic oscillator of the ultrasonic transducer carries,

and the wedge and the outer surface of the pipe wall are separate elements such that the outer surface of the pipe wall forms an incidence point for an ultrasonic wave transmitted from the ultrasonic transducer.

2. (Previously Presented) The ultrasonic flowmeter according to claim 1, wherein a contact surface of the wedge with the fluid pipe is equal to the curvature of the fluid pipe.

3. (Canceled).

4. (Previously Presented) The ultrasonic flowmeter according to claim 1, wherein a material of the wedge from the ultrasonic transducer to the outer surface of the fluid pipe has an acoustic impedance equal to that of the fluid pipe.

5. (Currently Amended) A wedge used for an ultrasonic flowmeter for measuring a flow rate of a fluid to be measured, said ultrasonic flowmeter comprising an ultrasonic transducer including an ultrasonic transmitter for launching ultrasonic pulses of a prescribed frequency into the fluid to be measured in a fluid pipe from the ultrasonic transducer along a

measurement line, and a receiver for receiving ultrasonic echoes reflected from a measurement region among the ultrasonic pulses incident into the fluid to be measured; a flow velocity distribution measurement means for measuring flow velocity distribution of the fluid to be measured in the measurement region based on the received ultrasonic echoes; and a flow rate operation means for calculating a flow rate of the fluid to be measured in the measurement region based on the flow velocity distribution of the fluid to be measured, said wedge comprising:

a fixation unit configured to fix said ultrasonic transducer to the fluid pipe relating to the fluid to be measured; and

an ultrasonic transmitting unit fixed to the fixation unit and to the outer surface of the fluid pipe,

wherein the transducer is fixed on the wedge such that at the prescribed frequency a distance of wave propagation from said ultrasonic transducer to an outer surface of the fluid pipe is an integral multiple of a half-wave length of an ultrasonic wave incident into the fluid to be measured, and the prescribed frequency is determined by:

determining a distance of wave propagation from the outer surface of the fluid pipe to an inner surface of the fluid pipe, and

setting the prescribed frequency as a frequency of an ultrasonic wave generated by the transducer where the distance of wave propagation from the outer surface of the fluid pipe to the inner surface of the fluid pipe is an integral multiple of a half-wave length of an ultrasonic wave incident into the fluid to be measured, and

wherein a distance in a direct line from the ultrasonic transducer in the ultrasonic transmitting unit to the outer surface of the fluid pipe is longer than a distance calculated by multiplying a velocity with which an ultrasonic wave penetrates through the wedge and a time of dead zone that an ultrasonic oscillator or the ultrasonic transducer carries,

and the wedge and the outer surface of the pipe wall are separate elements such that the outer surface of the pipe wall forms an incidence point for an ultrasonic wave transmitted from the ultrasonic transducer.

6. (Previously Presented) The wedge according to claim 5, wherein a contact surface of the wedge with the fluid pipe is equal to the curvature of the fluid pipe.

7. (Canceled).

8. (Previously Presented) The wedge according to claim 5, wherein a material of the ultrasonic transmitting unit in the wedge has an acoustic impedance equal to that of the fluid pipe.

9. (Currently Amended) An ultrasonic flowmeter for measuring a flow rate of a fluid to be measured, comprising:

an ultrasonic transducer including,

an ultrasonic transmitter configured to launch ultrasonic pulses of a prescribed frequency into the fluid to be measured in a fluid pipe from the ultrasonic transducer along a measurement line, and

a receiver configured to receive ultrasonic echoes reflected from a measurement region among the ultrasonic pulses incident into the fluid to be measured;

a flow velocity distribution measurement unit configured to measure flow velocity distribution of the fluid to be measured in the measurement region based on the received ultrasonic echoes

a flow rate operation unit configured to calculate a flow rate of the fluid to be measured in the measurement region based on the flow velocity distribution of the fluid to be measured; and

a wedge configured to fix said ultrasonic transducer to the outer surface of the fluid pipe for the fluid to be measured,

wherein the transducer is fixed on the wedge such that at the prescribed frequency a distance of wave propagation from said ultrasonic transducer to an outer surface of the fluid pipe is an integral multiple of a half-wave length of an ultrasonic wave incident into the fluid to be measured, and the prescribed frequency is determined by:

determining a distance of wave propagation from the outer surface of the fluid pipe to an inner surface of the fluid pipe, and

setting the prescribed frequency as a frequency of an ultrasonic wave for which the distance of wave propagation from the outer surface of the fluid pipe to the inner surface of the fluid pipe is an integral multiple of a half-wave length of an ultrasonic wave incident into the fluid to be measured; and

wherein a distance from the ultrasonic transducer in a direct line to the outer surface of the fluid pipe contacting the wedge is made longer than a distance obtained from multiplying a velocity of the ultrasonic wave penetrating through the wedge by a time of dead zone that an ultrasonic oscillator of the ultrasonic transducer carries,

and the wedge and the outer surface of the pipe wall are separate elements such that the outer surface of the pipe wall forms an incidence point for an ultrasonic wave transmitted from the ultrasonic transducer.